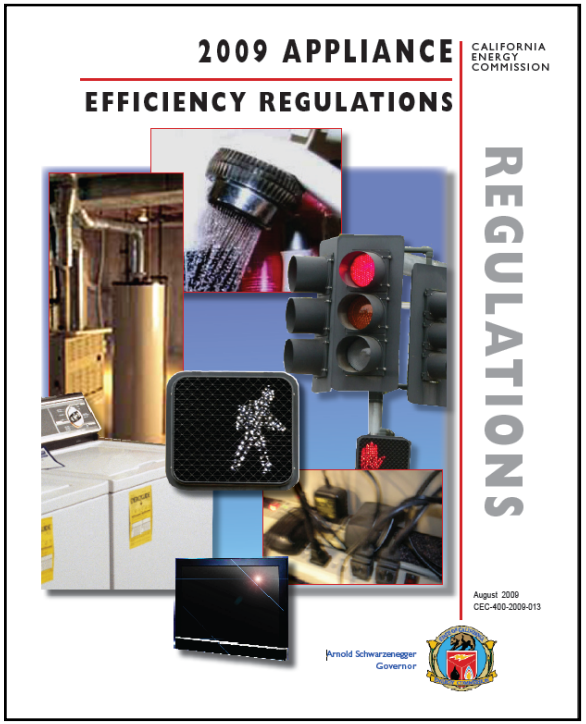

California IOU Codes and Standards Program: Overview

October 11, 2010
California Energy Commission, Staff Workshop

Docket No. 09-AAER-2; RE: 2010 Rulemaking proceedings
Phase II on Appliance Efficiency Regulations

Presentation by:
Pat Eilert, Pacific Gas and Electric Company

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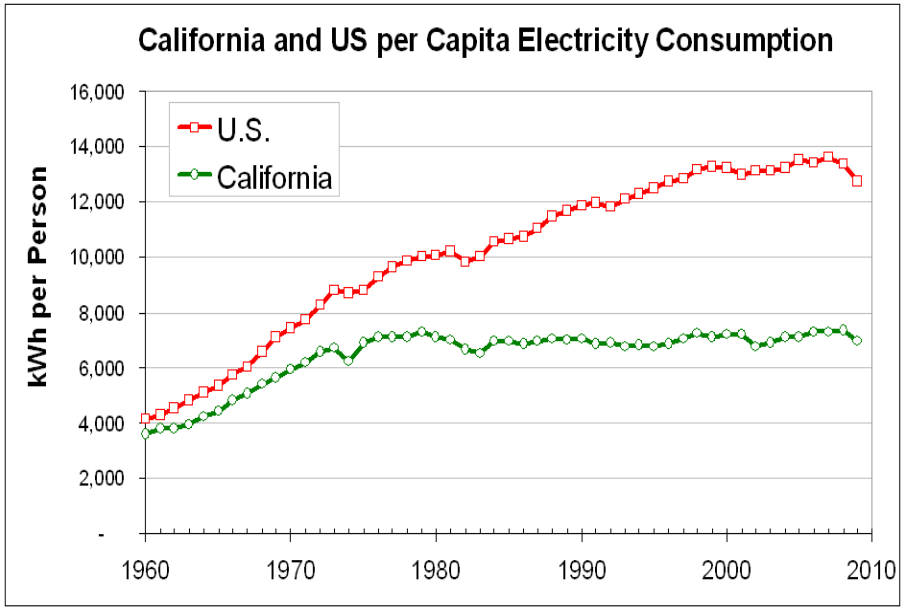
PG&E

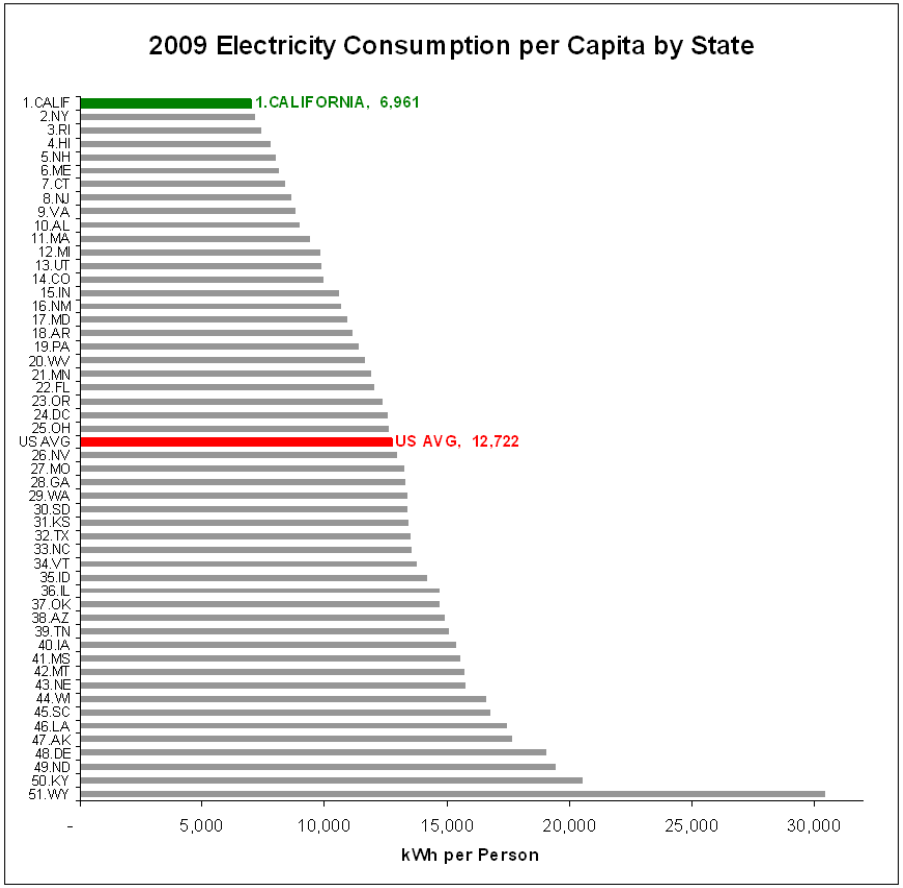
One IOU Statewide Program with Four Subprograms

Subprogram	Activity
Appliance Standards	• **Title 20: Develop Codes And Standards Enhancement (CASE) studies to document cost effectiveness and feasibility. Participate in public process.** • **US DOE: Review and analyze US DOE public documents, conduct research, and develop comments.**
Building Codes	• Develop Title 24 CASE studies and support public process. • Engage in national standards activities that affect California.
Compliance Enhancement Support	• Outreach, education and training to industry groups engaged in compliance with building and appliance regulations.
Reach Codes: Local Government Ordinances	• Develop cost-effectiveness analyses in support of local government adoption of ordinances beyond Title 24 and support CEC approval.

Codes and standards have helped stabilize per capita electricity consumption

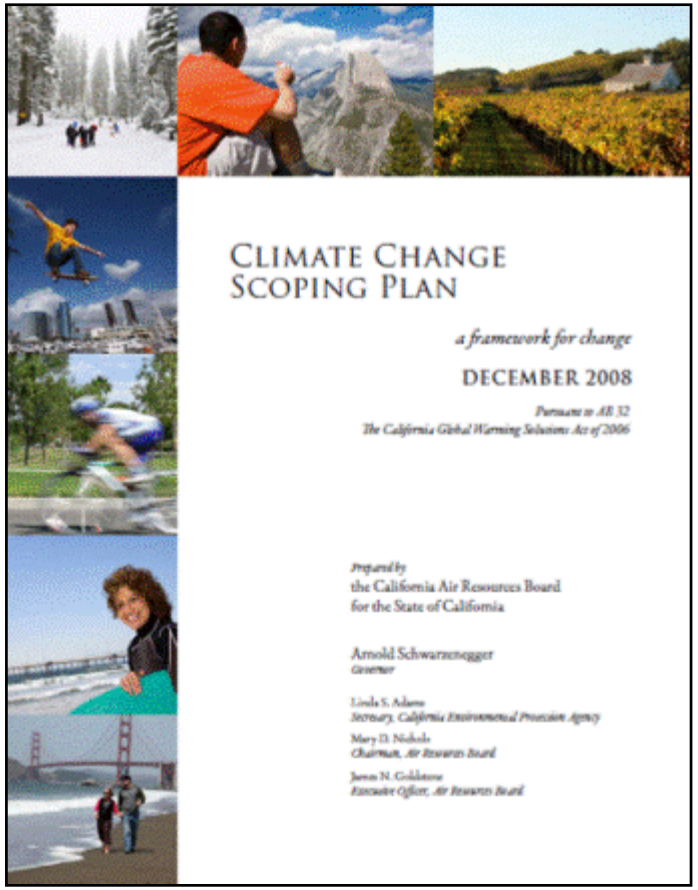
- C&S have contributed to relatively flat per capita electricity consumption in California since 1974
- California leads the nation at nearly half the US average





Sources: Analysis of EIA, US Census, and CEC data. See appendix for detailed sources

Expanding and strengthening appliance standards is first key element in AB 32 Scoping Plan



EXECUTIVE SUMMARY

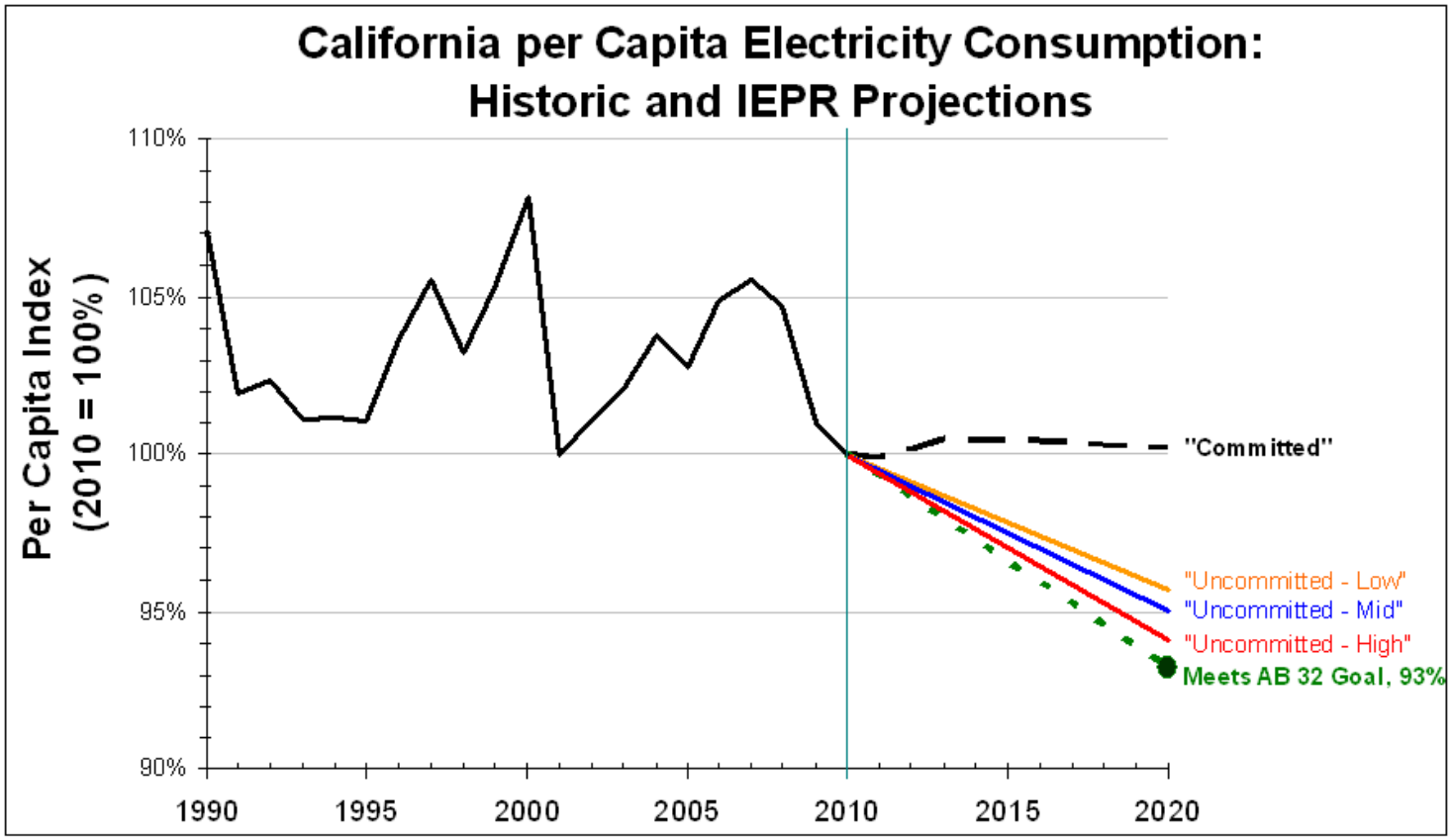
California strengthened its commitment to develop a comprehensive approach to address climate change when Governor Schwarzenegger signed Assembly Bill 32, the Global Warming Solutions Act of 2006 (Núñez, Chapter 488, Statutes of 2006). By requiring in law a reduction in greenhouse gas emissions to 1990 levels by 2020, California set the stage for its transition to a clean energy future. This historic step helped put climate change on the national agenda, and has spurred action by many other states.

Key elements of California's recommendations for reducing its greenhouse gas emissions to 1990 levels by 2020 include:

- **Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;**
- **Achieving a statewide renewables energy mix of 33 percent;**
- **Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;**
- **Establishing targets for transportation-related greenhouse gas emissions for regions throughout California, and pursuing policies and incentives to achieve those targets;**

Meeting AB 32 electricity goals requires savings beyond "Committed" and "Uncommitted" IEPR Scenarios

Per capita electricity needs to drop 7% (or roughly 500 kWh/year per person) by 2020 to reach AB 32 energy efficiency goal.



Notes: Committed = Savings relative to AB32 baseline embedded in the *2009 Integrated Energy Policy Report Adopted Demand Forecast.* Uncommitted = CEC savings scenarios (low, mid, and high) incremental to IEPR Demand Forecast. Savings are not "firm" or "locked-in" yet. Source: Analysis based on CEC *2009 IEPR.*

California Long Term Energy Efficiency Strategic Plan: Vision, Goals, and "Big Bold Initiatives"

1.4 STRATEGIC VISION AND GOALS

With a foundation of innovation, integration and collaboration, this *Plan* establishes a three-part vision:

New Title 20 Proposals address strategic visions

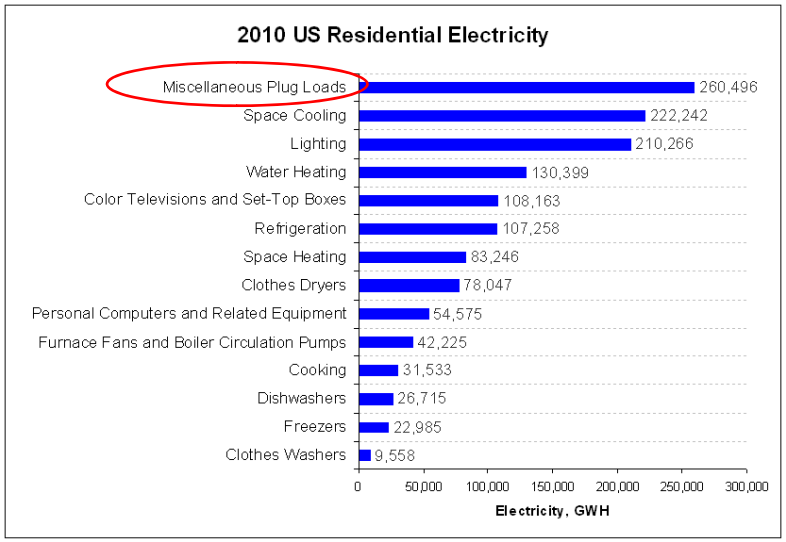
1. All cost-effective, reliable, and feasible energy efficiency measures and actions are implemented in an integrated systems or whole-building approach.
2. Strategies, programs, measures and institutional structures must provide long-term energy savings.
3. Energy efficiency will generate significant reductions in greenhouse gas emissions.

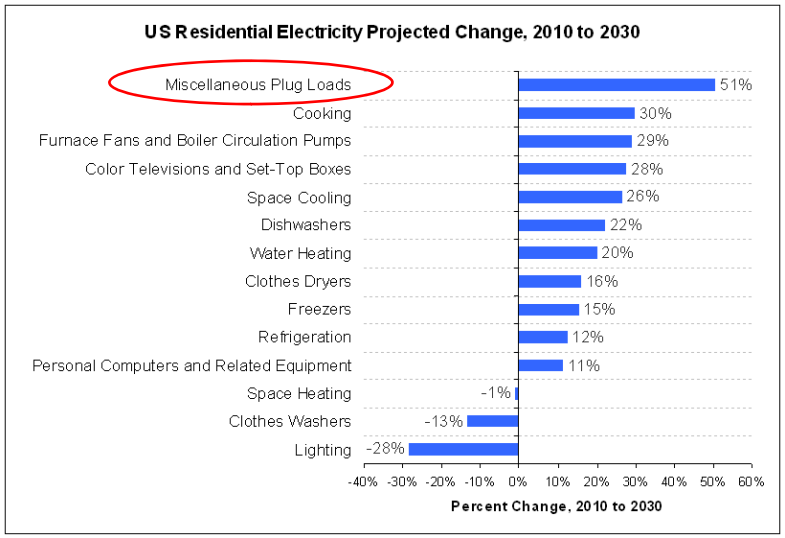
This vision embraces four specific goals, known as the "Big Bold Energy Efficiency Strategies," or Programmatic Initiatives, established by the CPUC in D.07-10-032 and D.07-12-051:

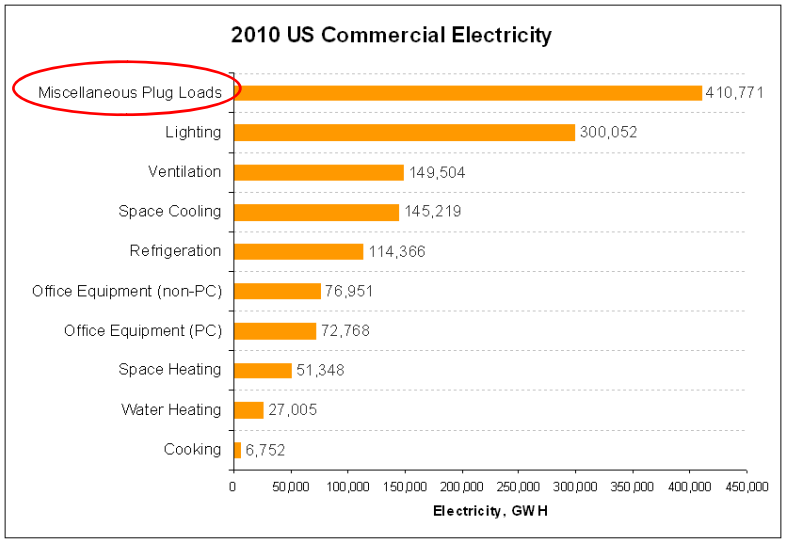
New Title 20 Proposals necessary for first two goals

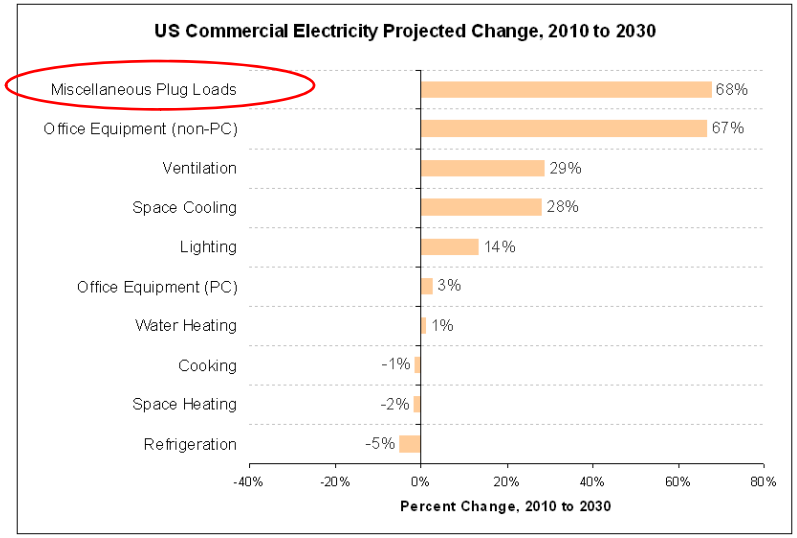
1. All new residential construction in California will be zero net energy by 2020[7];
2. All new commercial construction in California will be zero net energy by 2030;
3. Heating, Ventilation and Air Conditioning (HVAC) will be transformed to ensure that its energy performance is optimal for California's climate; and
4. All eligible low-income customers will have a meaningful opportunity to participate in the LIEE program and will be provided all cost effective energy efficiency measures in their residences by 2020.

Addressing Plug Load and Other Load Growth is a Critical Pathway









Source: *Annual Energy Outlook 2010*. Energy Information Administration. 2010 to 2030 population growth projected at 20%.

Note: Residential miscellaneous includes small electric devices, video and audio equipment, game consoles, coffee makers, and other uses. Commercial non-PC office equipment includes servers and mainframe computers. Commercial miscellaneous includes video displays, medical equipment, and other equipment.

California Long Term Energy Efficiency Strategic Plan: Specific Goals and Strategies

Goal 1: Code Enhancement and Expansion

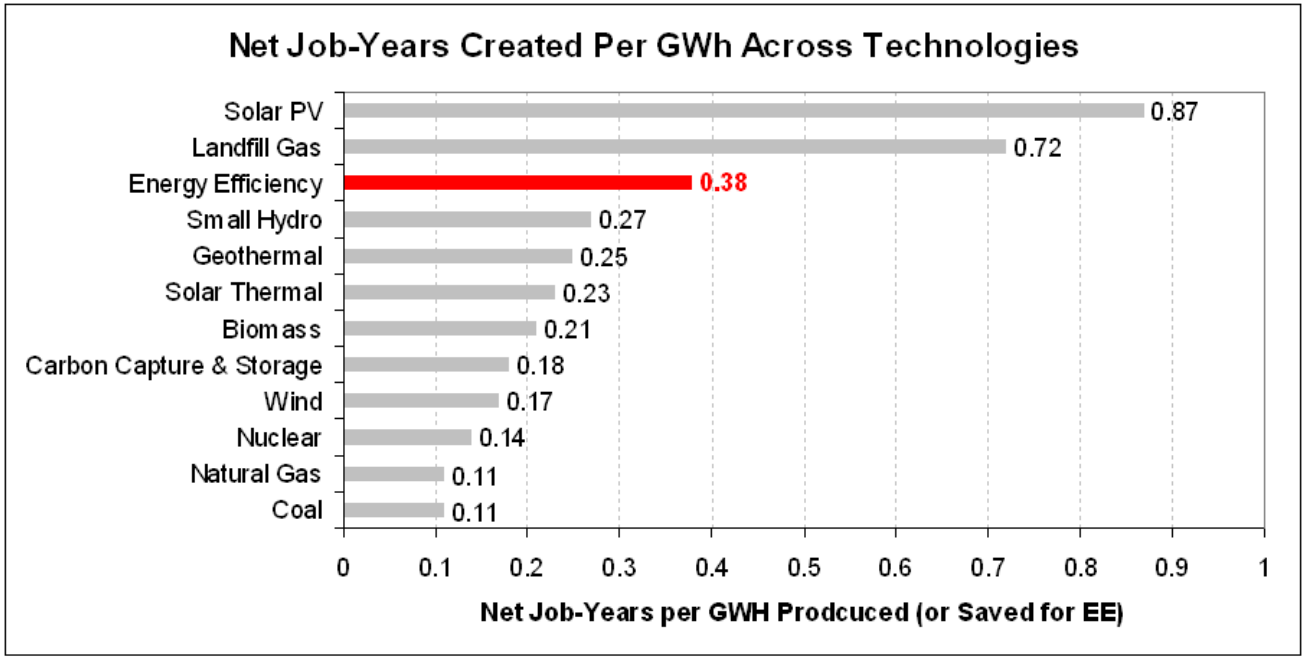
Implementation Plan and Timeline				
Strategies	**Near-Term (2009-2011)**	**Mid-Term (2012-2015)**	**Long-Term (2016-2020)**	**2021 – Beyond**
1.1: Develop more stringent codes and standards.	• Adopt a progressive set of building codes; including one or two voluntary "reach code" tiers for residential and commercial sectors. • Lower the renovation threshold at which the code applies to an entire existing structure	• Develop road map for codes and standards to enhance Title 20 and Title 24 codes in a "top-down" approach • Increase building commissioning requirements for new buildings and retrofits.	• Development of reach codes for buildings as "net producers" energy. • Codes and Standards require net zero residential buildings by 2020	• Codes and Standards require net zero commercial buildings by 2030
1.2: Expand Titles 24 and 20 to address all significant energy end uses	• Expand Title 20 to cover additional plug loads such as copy machines, printers, battery chargers, televisions.	• Expand Title 20 and Title 24 to cover additional uses such as server farms, process loads and water use.	• Investigate expansion of Titles 24 and 20 to address all significant energy end uses (manufacturing, agricultural, healthcare, etc.).	• Ongoing

Source: http://www.californiaenergyefficiency.com/docs/CA_longterm_EE_Strategic%20Plan.pdf

Job creation in the energy sector

"Non-fossil fuel technologies (renewable energy, EE, low carbon) create more jobs per unit energy than coal and natural gas"

-Recent study from Hass School of Business and the Energy and Resources Group, UC, Berkeley



Notes:

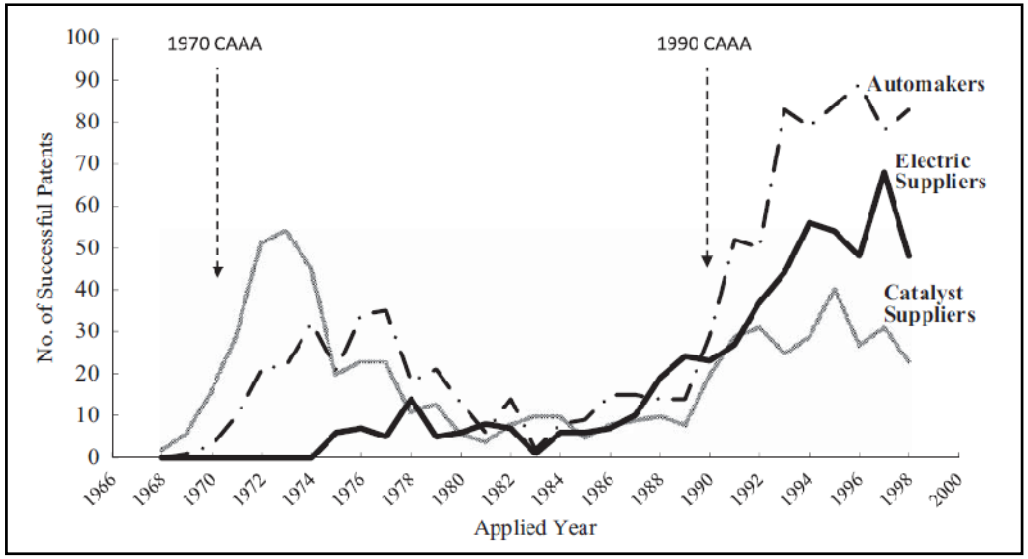
1/One job-year (or ''full-time equivalent'' FTE job) is full time employment for one person for a duration of 1 year.

2/Values are averages across reviewed studies. Energy Efficiency range is 0.17 to 0.59 job-years/GWH

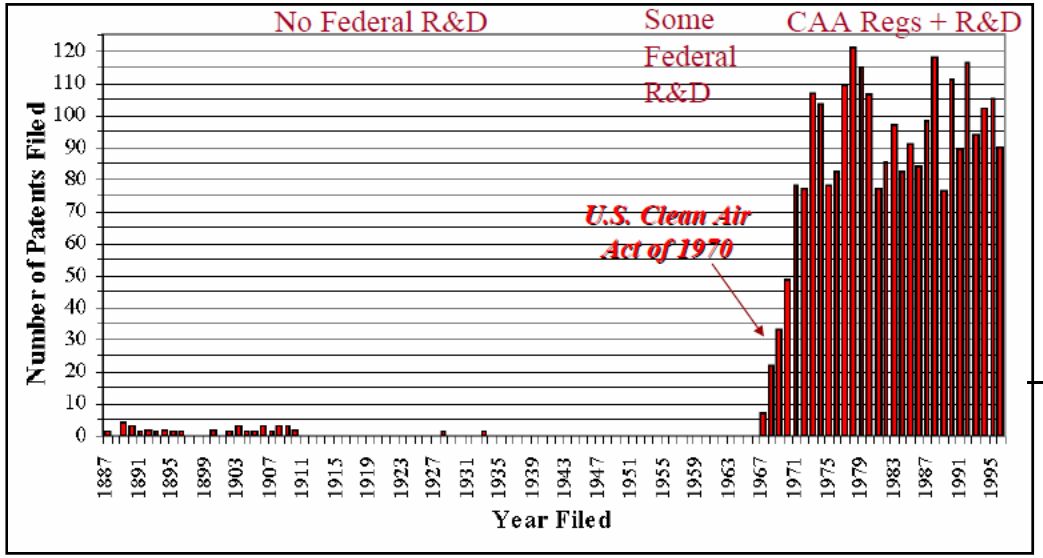
3/The majority of jobs created from energy efficiency are from induced employment which accounts for the expenditure-induced effects in the general economy due to the economic activity and spending of direct and indirect employees, e.g. non industry jobs created such as teachers, grocery store clerks, and postal workers. When discussing energy efficiency, a large portion of the induced jobs are the jobs created by the household savings due to the energy efficiency measures. See appendix for job definitions. Values are for **net job gains** which take into account the job losses from less electric generation.

4/Source: Max Wei, Shana Patadia, and Daniel M.Kammen. *Putting renewables and energy efficiency to work: How many jobs can the clean energy industry generate in the US?* Energy Policy 38 (2010) 919–931.

Innovation: patent trends suggest that regulatory policies can stimulate innovations that reduce emissions



Patenting trends by automakers, auto electronics, and catalyst suppliers relative to 1970 and 1990 Clean Air Act Amendments



U.S. patent activity in SO_2 control technology before and after Clean Air Act of 1970

Sources: (1) "Forcing technological change: A case of automobile emissions control technology development in the US". Lee et al. *Technovation.* 30 (2010) 249–264. (2)"The Government Role in Technology Innovation: Lessons for the Climate Change Policy" by Edward Rubin, Presentation to the Climate Action Team CalEPA. 12/13/2005.

APPENDIX

Sources for Per Capita Energy Consumption

Population data

- 1960 – 2009 (Historic)
  - US Census, 1960-1990: http://www.census.gov/popest/archives/1980s/80s_st_totals.html
  - US Census, 1990-2000: http://www.census.gov/popest/archives/1990s/ST-99-03.txt
  - US Census, 2000-2010: http://www.census.gov/popest/states/NST-ann-est.html
- 2010 – 2020 (Forecast)
  - EIA, Table 20 http://www.eia.doe.gov/oiaf/aeo/aeoref_tab.html
  - CEC: http://www.energy.ca.gov/2009publications/CEC-200-2009-012/index.html

Electricity Consumption

- 1960 – 2009 (Historic)
  - EIA: http://www.eia.gov/emeu/states/_seds_updates.html
  - EIA: http://www.eia.gov/state/SEP_MoreConsump.cfm

- 2010 – 2020 (Forecast)
  - CEC: http://www.energy.ca.gov/2009publications/CEC-200-2009-012/index.html
  - EIA, Table 2 http://www.eia.doe.gov/oiaf/aeo/aeoref_tab.html

Job Creation Definitions

The definitions of direct, indirect, and induced jobs vary widely by study. Wei et al describes the definitions and usage of these categories as follows.

Direct employment includes those jobs created in the design, manufacturing, delivery, construction/installation, project management and operation and maintenance of the different components of the technology, or power plant, under consideration. This data can be collected directly from existing facilities and manufacturers in the respective phases of operation.

Indirect employment refers to the ‘‘supplier effect’’ of upstream and downstream suppliers. For example, the task of installing wind turbines is a direct job, whereas manufacturing the steel that is used to build the wind turbine is an indirect job.

Induced employment accounts for the expenditure-induced effects in the general economy due to the economic activity and spending of direct and indirect employees, e.g. non industry jobs created such as teachers, grocery store clerks, and postal workers. When discussing energy efficiency, a large portion of the induced jobs are the jobs created by the household savings due to the energy efficiency measures.

Source: Max Wei, Shana Patadia, and Daniel M. Kammen. *Putting renewables and energy efficiency to work: How many jobs can the clean energy industry generate in the US?* Energy Policy 38 (2010) 919–931.